

JOHN ASHCROFT  
Governor

G. TRACY MEHAN III  
Director



STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MEMORANDUM

Eisenberg Fill Area  
Clay Co.

Division of Energy  
Division of Environmental Quality  
Division of Geology and Land Survey  
Division of Management Services  
Division of Parks, Recreation,  
and Historic Preservation

Site: Leo Eisenberg  
ID #: MOD 985768175  
Break: 11.5  
Other: 1-4-50

DATE: January 4, 1990

TO: Jim Armes, Kansas City Regional Office, DEQ

FROM: *B. B. S.* Jim B. Fels, Engineering/Environmental Geology, DGLS

SUBJECT: Eisenberg Fill PA/SI Site

LOCATION: SW 1/4, Sec. 13, T. 50 N., R. 33 W., Clay County

The Eisenberg fill site is located on the Missouri River floodplain in Clay County, near the Kansas state border. This demolition fill is estimated to be 5-15 feet thick and visibly contains concrete, bricks, iron and other bulky solid waste. The cover soil on the fill is approximately 0-2 feet thick and has a relatively good vegetative cover. The entire floodplain, including the fill area, has a flat to gently undulating topography, sloping 0-2% to the south. This part of the floodplain is highly industrialized with much of the natural surface being covered with pavement.

The aquifer of concern is the Missouri River alluvium which lies directly beneath the site. These fluviially deposited materials are stratified to some extent and average 100 feet in thickness. The thickness can vary depending on the underlying bedrocks erosional surface. Generally, there is gravel at the base of the alluvium which is the highest water producing zone within the strata. Above this gravel, there is usually a gradational fining upward sequence of sand, silt and clay. Yields of up to 2000 g.p.m. can come from this aquifer but wells generally produce between 500 and 1000 g.p.m. to minimize drawdown. The water table is expected to be 20-30 feet below the surface in this area. Groundwater flow in the alluvium is to the southeast and discharges into the river during normal conditions, but excessively high or low river stages can effect both the water table and the direction of flow. During flooding or exceptionally high river stages, the river can recharge the aquifer and change the flow to an eastward direction. Likewise during prolonged low river stages, the river will drain the aquifer and create a southerly flow. The areas closest to the river will notice the most change.

Bedrock beneath the alluvium is Pennsylvanian age and probably the Pleasanton group which consists of shale, limestone and sandstone. The Pleasanton is estimated to be 30-80 feet thick in this area. The Pennsylvanian aquifer is confined due to the low permeability of shale, has low yields and highly mineralized water.

Native soil at this site is a silty clay loam derived from flooding events. Topsoil is a dark brown silty clay loam (CL) approximately 2 feet



thick with moderate to low permeability. Subsoil consists of a brown clayey silt (ML-CL) which may contain local layers of fine sand. The subsoil is estimated to be 2-3 feet thick before a gradational contact with the sandy alluvium is encountered. It is important to note that this is a profile of native soils as seen nearby the site. The depth of cut, if any, and origin of the cover soil is not known. The bulky, porous fill material has a potentially high permeability so as to allow a perched water table to be present at the base of the fill.

Surface water at this site is limited due to the nature of the industrialized area. Two drainage ditches that carry stormwater runoff are located on the site. Although these ditches may pond water, flow is encountered only after precipitation events. These ditches each flow approximately 1 1/2 miles and gain flow from downslope runoff before entering the Missouri River.

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Location: SW 1/4, SW 1/4, NE 1/4, SW 1/4; W 1/2, NW 1/4, SE 1/4, SW 1/4;  
E 1/2, NE 1/4, and E 1/2, SE 1/4, SW 1/4, SW 1/4, Sec. 13,  
T. 50 N., R. 33 W.  
39° 8' 21.25" N, 94° 33' 47.33" W  
Kansas City Quadrangle, Clay County

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Name/description of aquifer(s) of concern:

The Missouri River alluvium is the aquifer of concern and the major water producing aquifer of this area. Alluvial materials are somewhat stratified and approximately 100 feet thick. Ideally, there is a zone of gravel near the base prograding into sand, silt and finally clay near the surface. The more porous gravel layers are the highest yielding zones within the alluvium. Yields up to 2000 g.p.m. of potable water are possible from this aquifer. Bedrock below the alluvium is Pennsylvanian age and probably the Pleasanton group of shale, limestone and sandstone. The low permeability of the shale restricts vertical movement of water, thus separating the potable alluvial aquifer from the highly mineralized Pennsylvanian and deeper aquifers. References 1, 2, 4, 8

Depth(s) from the ground surface to the highest seasonal level of the saturated zone [water table(s)] of the aquifer of concern:

The average depth to groundwater in the alluvium is between 20 and 30 feet below the surface. However during prolonged high river stages, the Missouri River can recharge the alluvial aquifer and increase the water level to an estimated 15 feet below the surface. This increase would be most noticeable in areas closest to the river. A perched water table may also be present at the base of the fill during wet seasons approximately 5-15 feet below the surface. References 2, 3, 4, 7, 8

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Soil type in unsaturated zone:

The origin of the soil used for cover material and the depth of cut, if any, into the native soil is unknown but a profile of the native soil would be as follows: Approximately 2 feet of dark brown silty clay loam underlain by 2 to 3 feet of light brown clayey silt containing local layers of fine sand. This subsoil will have a gradational contact with the underlying sandy alluvium. References 3, 7

Permeability associated with soil type:

silty clay loam -  $10^{-5}$  -  $10^{-7}$  cm/sec.

clayey silt -  $10^{-4}$  -  $10^{-6}$  cm/sec.

fine sand -  $10^{-3}$  -  $10^{-5}$  cm/sec. References 6, 7, 9, 10

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Average slope of facility in percent:

The fill is relatively flat with 0-1% slope. The only relief is a small depression in the middle of the fill area and drainage ditches on the northeast and west sides of the fill. Reference 5, 7.

Name/description of nearest downslope surface water:

There are two drainage ditches located on this site. One flows to the northeast, the other flows to the south. Both of these flow through heavily industrialized areas where most of the ground surface is covered with pavement so they gain runoff flow before reaching the Missouri River. These ditches may pond water but are expected to flow only after a rainfall event. References 5, 7

Average slope of terrain between facility and above-cited surface water body in percent:

The drainage ditches are both on site and flow across the floodplain which is typically flat to gently undulating with 0-2% slopes. References 5, 7

Is the facility located either totally or partially in surface water?

Only partially during storm events when the drainage ditches may flow water and flooding events may totally submerge the site. But under normal conditions, pools in drainage ditches will be the only surface water on site. Reference 5, 7

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Is the facility completely surrounded by areas of higher elevation?

No, there are hills to the north but the floodplain extends west and east of the site with the river to the south. References 5, 7

Distance to nearest downslope surface water:

The drainage ditches are on site and flow approximately 1 1/2 mile before entering the Missouri River. References 5, 7

## REFERENCES

- 1 "Stratigraphic Succession in Missouri", Missouri Geological Survey and Water Resources, Vol. XL, 1961
- 2 "Reconnaissance of the Groundwater Resources of the Missouri River alluvium between Miami and Kansas City, Missouri", Emmett, L.F. and Jeffery, H.G., USGS Atlas HA-344, 1970
- 3 "Soil Survey of Clay and Ray Counties, Missouri", USDA-SCS, 1982
- 4 Well logs on file at DGLS
- 5 North Kansas City Quadrangle, USGS 7 1/2', 1:24,000, photorevised 1970 and 1975
- 6 "Hazardous Waste Ranking System - A Users Manual", the MITRE Company
- 7 Site visit on 12/14/89 by J.B. Fels
- 8 "Water Resources of the Kansas City Area, Missouri and Kansas", USGS Circ. 273, 1953
- 9 "Applied Hydrogeology", Fetter, C.W., Merrill Publishing Company, 1988
- 10 "Groundwater", Freeze, R.A. and Cherry, J.A., Prentice Hall, 1979